INTERNATIONAL TELECOMMUNICATION UNION

# ITU-T P.931

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TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

SERIES P: TELEPHONE TRANSMISSION QUALITY, TELEPHONE INSTALLATIONS, LOCAL LINE NETWORKS

Audiovisual quality in multimedia services

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# Multimedia communications delay, synchronization and frame rate measurement

ITU-T Recommendation P.931

(Previously CCITT Recommendation)

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ITU-T RECOMMENDATION P.931

# MULTIMEDIA COMMUNICATIONS DELAY, SYNCHRONIZATION AND FRAME RATE MEASUREMENT


## Summary

An aspect of true Multimedia Communications Systems, that sets them apart from a mere collection of unrelated channels, is their ability to maintain a temporal relationship between the different media.

This Recommendation specifies the parameters and measurement methods to assess relative synchronization between media channels, and two other key aspects of temporal quality. Transmission time, or delay through a channel, is critical when assessing a system's suitability for conversational and other interactive uses. Frame inter-arrival time and its reciprocal, frame rate, characterize a system's ability to deliver information continuously and consistently.

Multimedia systems combine video, audio and data channels to enhance communications. This Recommendation covers all these media. Video delay can vary widely over short sequences, audio and video sequences may be distorted during transmission, and data streams can have little or no structure and may contain bit errors. Although each media presents unique measurement challenges, the methods specified here meet and overcome them. The Mean Square Error based method expects and measures instantaneous video delay variations if present. The audio delay method accommodates channels where the original speech waveform is not preserved. There are also methods for data channels that take advantage of native structures and tolerate bit errors. All the methods allow test signals that are representative of the intended system applications.

The methods cover the capture of input and output media frame sequences with a common time scale, performing frame comparisons to determine active (non-repeated) output frames, and matching active output frames with unique input frames to determine transmission time and synchronization. The methods permit collection of delay, time skew, and frame inter-arrival time distributions which represent the desired parameters in their elemental forms.



## Source

ITU-T Recommendation P.931 was prepared by ITU-T Study Group 12 (1997-2000) and was approved under the WTSC Resolution No. 1 procedure on the 3rd of December 1998.